DEPARTMENT of ENVIRONMENTAL SERVICES
Water Division - Watershed Management Bureau

LAKE TROPHIC DATA

MORPHOMETRIC:

| | | | |
|---|---|---|---|
| Lake: | PAWTUCKAWAY LAKE | Lake Area (ha): | 364.22 |
| Town: | NOTTINGHAM | Maximum depth (m): | 15.2 |
| County: | Rockingham | Mean depth (m): | 2.9 |
| River Basin: | Coastal | Volume ($m^3$): | 10740000 |
| Latitude: | 43°04'22" N | Relative depth: | 0.7 |
| Longitude: | 71°09'08" W | Shore configuration: | 4.09 |
| Elevation (ft): | 250 | Areal water load (m/yr): | 6.67 |
| Shore length (m): | 27700 | Flushing rate ($yr^{-1}$): | 2.30 |
| Watershed area (ha): | 5361.3 | P retention coeff.: | 0.61 |
| % watershed ponded: | 0.2 | Lake type: | natural w/dam |

| BIOLOGICAL: | | 2 March 1999 | 11 August 1998 |
|---|---|---|---|
| DOM. PHYTOPLANKTON (% TOTAL) | #1 | ASTERIONELLA 99% | OSCILLATORIA 40% |
| | #2 | RUPTURED SYNURA COLO- | ARTHRODESMUS 10% |
| | #3 | NIES (NOT QUANTIFIED) | XANTHIDIUM 10% |
| PHYTOPLANKTON ABUNDANCE (units/mL) | | | |
| CHLOROPHYLL-A (µg/L) | | | 3.01 |
| DOM. ZOOPLANKTON (% TOTAL) | #1 | KERATELLA 51% | NO ZOOPLANKTON COUNTS |
| | #2 | NAUPLIUS LARVA 16% | AVAILABLE |
| | #3 | POLYARTHRA 12% | |
| ROTIFERS/LITER | | 40 | |
| MICROCRUSTACEA/LITER | | 10 | |
| ZOOPLANKTON ABUNDANCE (#/L) | | 51 | |
| VASCULAR PLANT ABUNDANCE | | | Common/Abun |
| SECCHI DISK TRANSPARENCY (m) | | | 4.2 |
| BOTTOM DISSOLVED OXYGEN (mg/L) | | 8.4 | 0.2 |
| BACTERIA (E. coli, #/100 ml) | #1 | | |
| | #2 | | |
| | #3 | | |

SUMMER THERMAL STRATIFICATION:

stratified

| | |
|---|---|
| Depth of thermocline (m): | 4.0 |
| Hypolimnion volume ($m^3$) : | 1607000 |
| Anoxic volume ($m^3$) : | 3255500 |

CHEMICAL:

Lake: PAWTUCKAWAY LAKE
Town: NOTTINGHAM

| | 2 March 1999 | | 11 August 1998 | | |
|---|---|---|---|---|---|
| DEPTH (m) | 4.0 | 8.0 | 2.0 | 5.5 | 11.0 |
| pH (units) | 6.1 | 6.1 | 6.4 | 5.9 | 6.3 |
| A.N.C. (Alkalinity) | 4.1 | 4.3 | 3.8 | 4.6 | 11.7 |
| NITRATE NITROGEN | 0.05 | 0.09 | < 0.05 | < 0.05 | 0.29 |
| TOTAL KJELDAHL NITROGEN | 0.50 | 0.30 | 0.40 | 0.30 | 0.70 |
| TOTAL PHOSPHORUS | 0.025 | 0.019 | 0.010 | 0.012 | 0.079 |
| CONDUCTIVITY (µmhos/cm) | 47.0 | 53.6 | 35.9 | 39.9 | 55.6 |
| APPARENT COLOR (cpu) | 34 | 39 | 45 | | 110 |
| MAGNESIUM | | | 0.59 | | |
| CALCIUM | | | 2.1 | | |
| SODIUM | | | 3.6 | | |
| POTASSIUM | | | 0.47 | | |
| CHLORIDE | 6 | 7 | 4 | 5 | 6 |
| SULFATE | 5 | 5 | 3 | 3 | 3 |
| TN : TP | 22 | 21 | 40 | 25 | 13 |
| CALCITE SATURATION INDEX | | | 4.0 | | |

All results in mg/L unless indicated otherwise

TROPHIC CLASSIFICATION: 1998

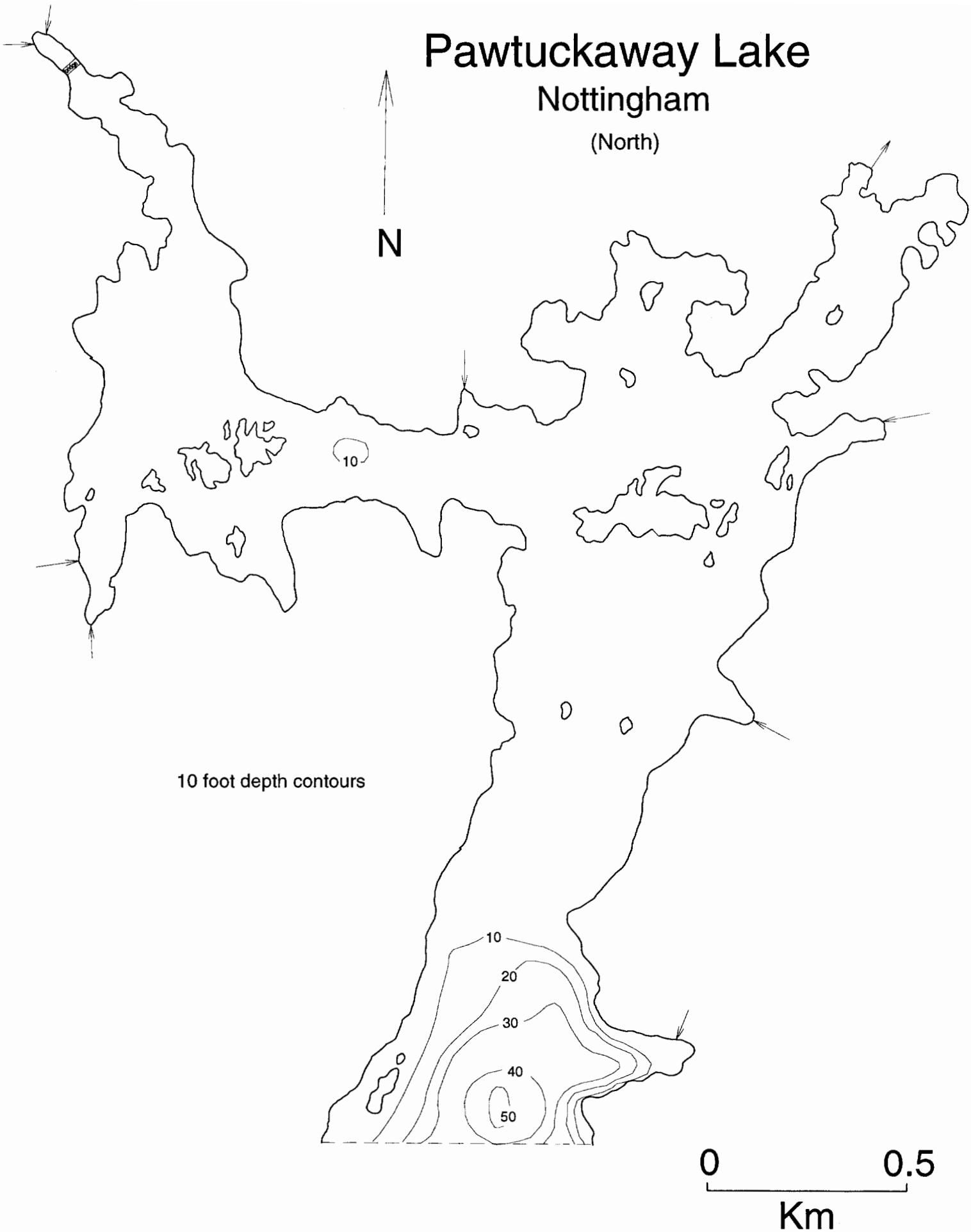
| D.O. | S.D. | PLANT | CHL | TOTAL | CLASS |
|---|---|---|---|---|---|
| 6 | 2 | 4 | 0 | 12 | Meso. |

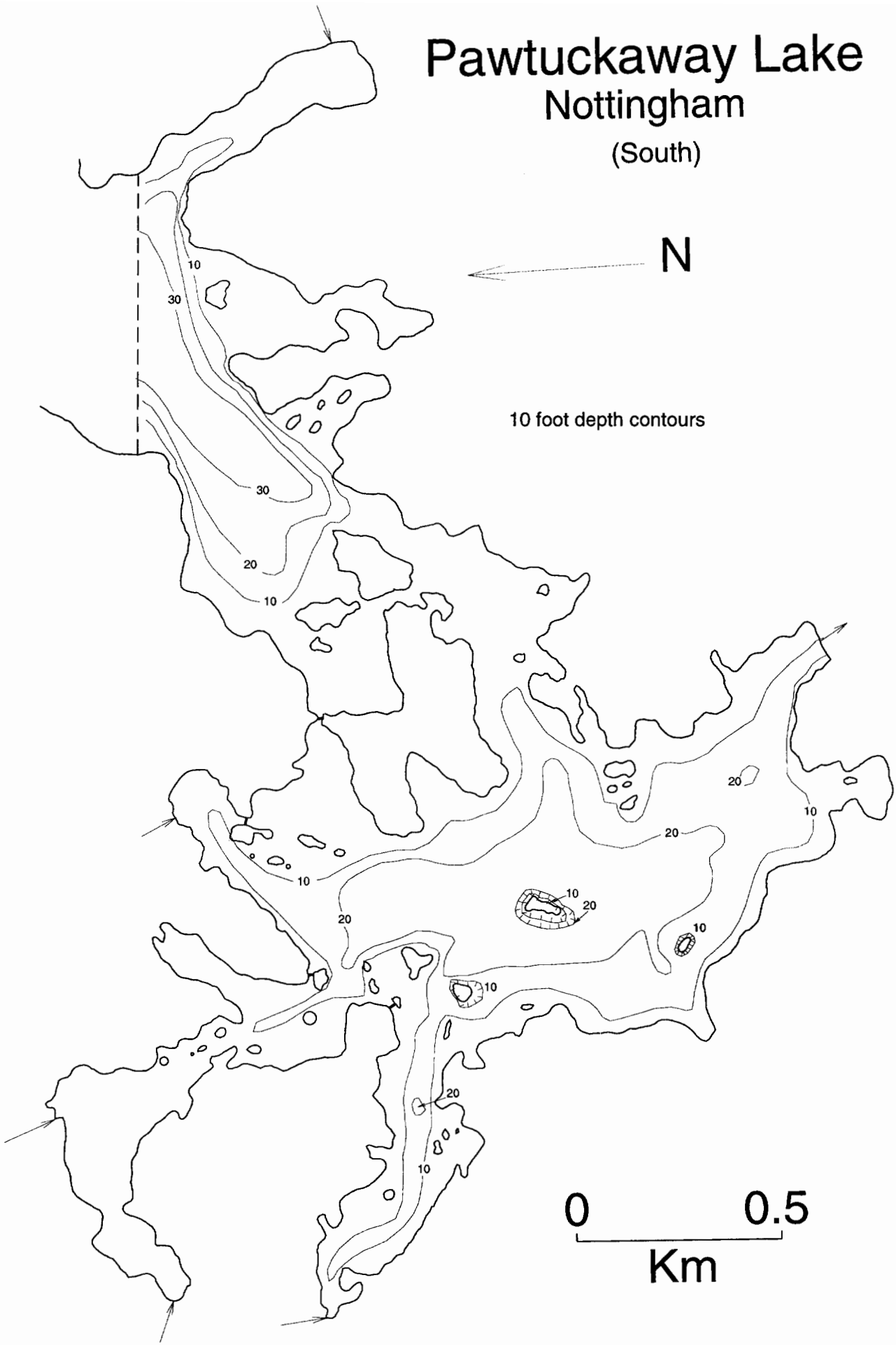
COMMENTS:

1. This lake was previously surveyed and classified in 1979 and 1989. It was borderline oligotrophic/mesotrophic in those two years, with an indication of an increased anoxic (no dissolved oxygen) area in 1989. The 1998 rating was borderline mesotrophic/eutrophic (one more point would have put it in the eutrophic class), showing increased macrophyte growth and a greater extent of anoxic water (essentially no D.O. below 3 meters in 1998 compared to 10 meters in 1989).

2. Pawtuckaway Lake has participated in VLAP since 1988 and has shown a worsening trend in chlorophyll and phosphorus during that time.

3. A 1991-92 diagnostic/feasibility study generally found mesotrophic conditions, although the deep spot had a meso/eutrophic rating. BMPs to reduce phosphorus runoff from a dairy farm were implemented as a result of this study.


Pawtuckaway Lake
Nottingham
(North)
N
10
10 foot depth contours
10
20
30
40
50
0
0.5
Km


Pawtuckaway Lake
Nottingham
(South)
N
10 foot depth contours
10
30
30
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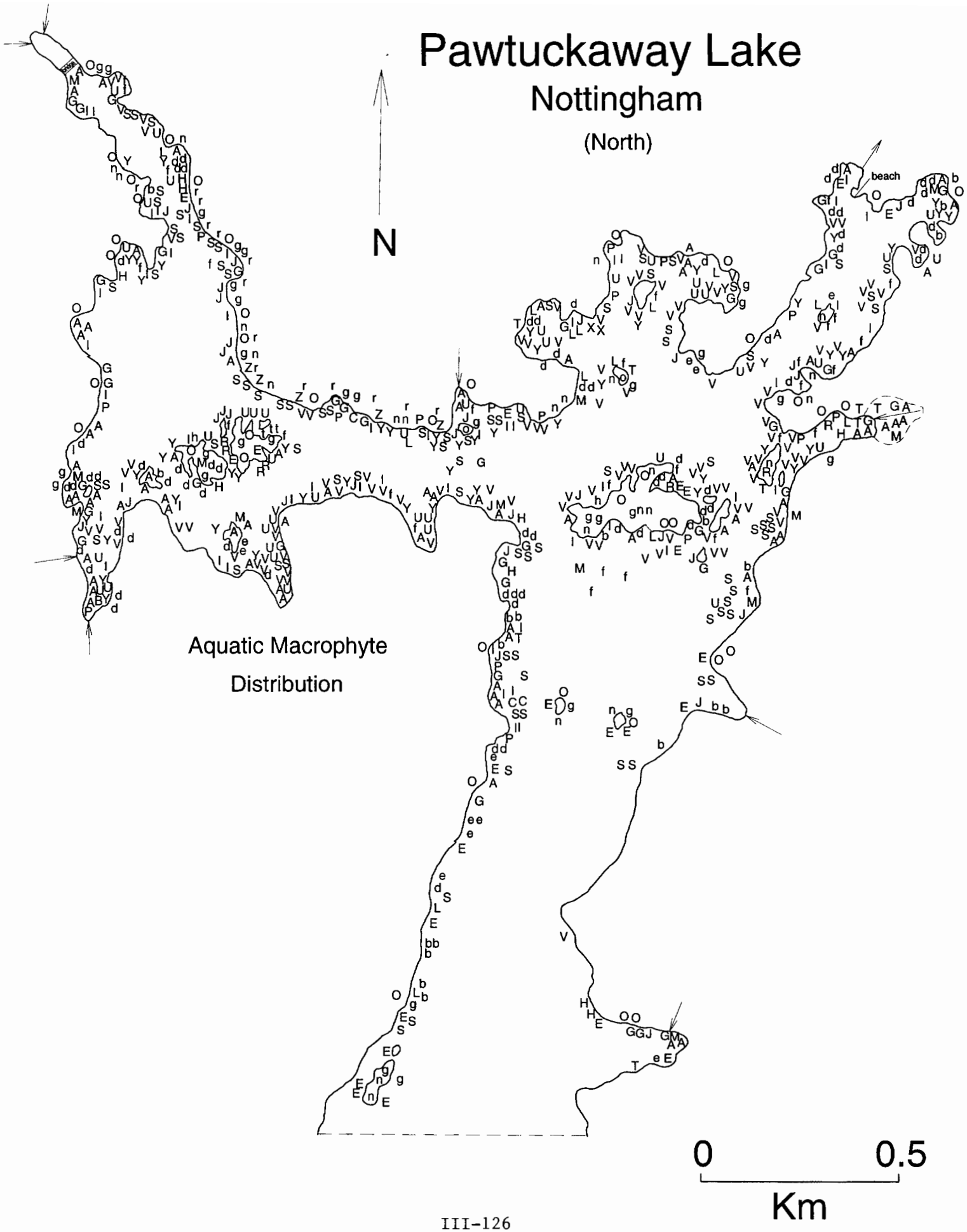
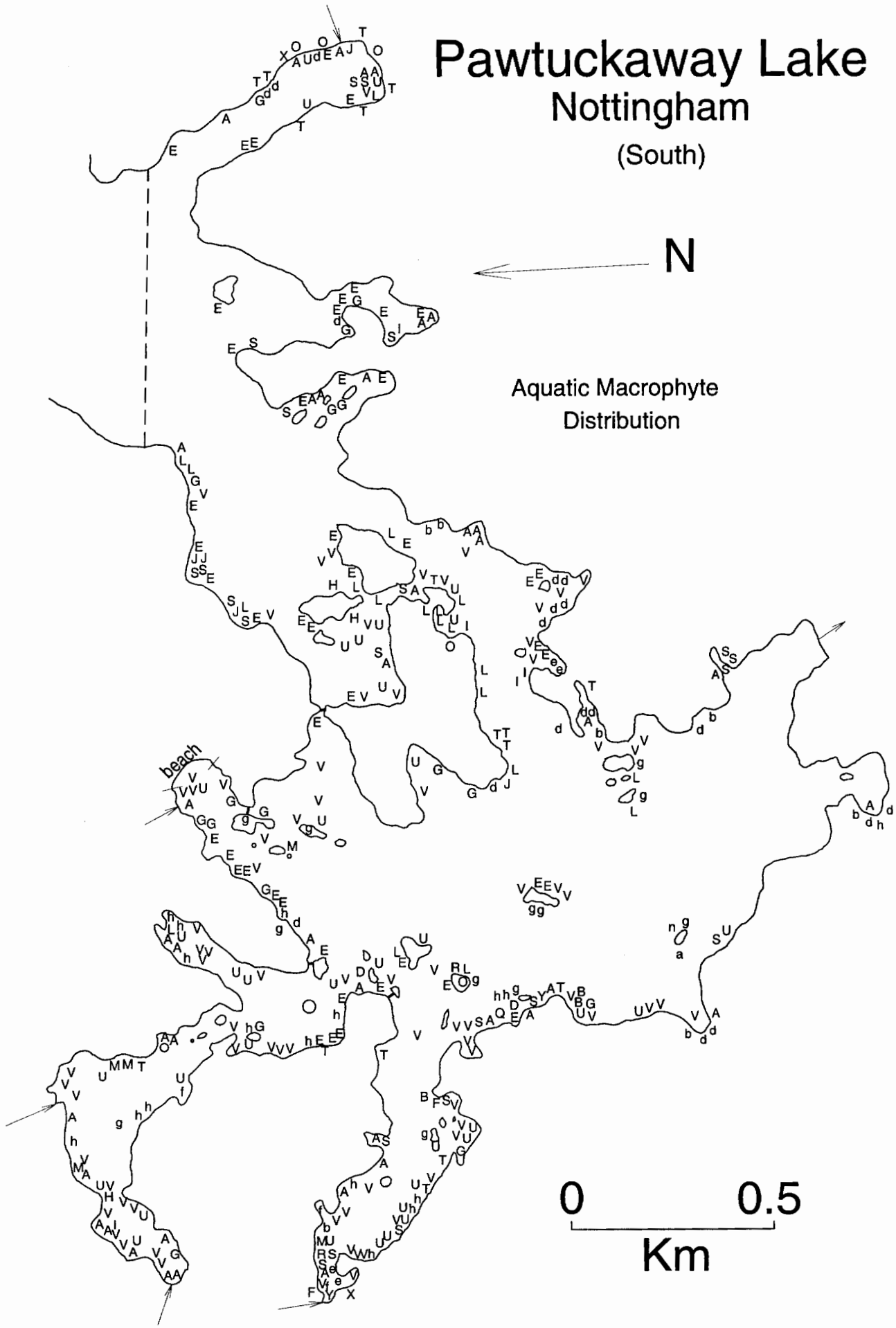

Pawtuckaway Lake
Nottingham
(North)
N
beach
Aquatic Macrophyte
Distribution
0
0.5
Km


Pawtuckaway Lake
Nottingham
(South)
N
Aquatic Macrophyte
Distribution
beach
0
0.5
Km

## AQUATIC PLANT SURVEY

LAKE: PAWTUCKAWAY LAKE TOWN: NOTTINGHAM DATE: 08/11/1998

| Key | PLANT NAME | | ABUNDANCE |
|---|---|---|---|
| | GENERIC | COMMON | |
| A | Sagittaria | Arrowhead | Scat/Common |
| B | Brasenia schreberi | Water shield | Sparse |
| T | Typha | Cattail | Scattered |
| d | Dulichium arundinaceum | Three-way sedge | Scattered |
| D | Elodea nuttallii | Waterweed | Sparse |
| f | | Filamentous algae | Scat/Common |
| G | Gramineae | Grass family | Common |
| F | Nymphoides cordatum | Floating heart | Sparse |
| M | Scirpus validus | Softstem bulrush | Sparse |
| O | Cephalanthus occidentalis | Buttonbush | Common/Abun |
| E | Eriocaulon septangulare | Pipewort | Common/Abun |
| Q | Isoetes | Quillwort | Sparse |
| b | Scirpus | Bulrush | Scattered |
| S | Sparganium | Bur reed | Abundant |
| V | Vallisneria americana | Tape grass | Abundant |
| U | Utricularia | Bladderwort | Abundant |
| a | Myrica asplenifolia | Sweet fern | Sparse |
| h | Gratiola | Hedge hyssop | Sparse |
| R | Potamogeton robbinsii | Robbins pondweed | Scattered |
| g | Myrica gale | Sweet gale | Common/Abun |
| n | Vaccinium corymbosum | High-bush blueberry | Scattered |
| K | | Unknown woody flower | Sparse |
| e | Eleocharis | Spike rush | Scattered |
| I | Potamogeton nodosus | Pondweed | Scattered |
| | | | |
| | | | |

OVERALL ABUNDANCE: Common/Abun

GENERAL OBSERVATIONS:

1. Plants occurred along the entire shoreline but were not a nuisance for swimming or navigation in the main water areas of the lake.
2. Plants were abundant in the Fundy cove area (northwest cove).
3. The blue-green alga *Oscillatoria* was the dominant phytoplankton – and clumps of this filamentous algae were observed in the water column.

# AQUATIC PLANT SURVEY

LAKE: PAWTUCKAWAY LAKE TOWN: NOTTINGHAM DATE: 08/11/1998

| Key | PLANT NAME | | ABUNDANCE |
|---|---|---|---|
| | GENERIC | COMMON | |
| Y | Nuphar | Yellow water lily | Sparse |
| P | Pontederia cordata | Pickerelweed | Sparse |
| k | Scutellaria | Skullcap | Sparse |
| Z | Solanum | Nightshade | Sparse |
| t | Ceratophyllum demersum | Coontail | Sparse |
| r | Clethra alnifolia | Sweet pepperbush | Scattered |
| C | Cyperaceae | Non-flowering sedge | Sparse |
| H | Hypericum | St. John's-wort | Sparse |
| X | Carex | Sedge | Sparse |
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OVERALL ABUNDANCE: Common/Abun

GENERAL OBSERVATIONS:

FIELD DATA SHEET

LAKE: PAWTUCKAWAY LAKE TOWN: NOTTINGHAM
DATE: 08/11/1998 WEATHER: RAINY

| | DEPTH (M) | TEMP (°C) | *DISSOLVED OXYGEN | OXYGEN SATURATION |
|---|---|---|---|---|
| | 0.1 | 26.3 | 7.7 | 94 % |
| | 1.0 | 26.2 | 7.3 | 90 % |
| | 2.0 | 26.1 | 7.1 | 87 % |
| | 3.0 | 25.5 | 6.2 | 75 % |
| | 4.0 | 19.8 | 0.1 | 2 % |
| | 5.0 | 15.1 | 0.1 | 1 % |
| | 6.0 | 13.0 | 0.2 | 2 % |
| | 7.0 | 12.0 | 0.2 | 1 % |
| | 8.0 | 10.7 | 0.2 | 1 % |
| | 9.0 | 10.1 | 0.1 | 1 % |
| | 10.0 | 9.8 | 0.2 | 1 % |
| | 11.0 | 9.3 | 0.2 | 1 % |
| | 12.0 | 8.9 | 0.2 | 1 % |
| | 13.0 | 8.8 | 0.2 | 1 % |
| | 14.0 | 8.7 | 0.2 | 1 % |
| | 14.5 | 8.9 | 0.2 | 1 % |
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SECCHI DISK (m): 4.2 COMMENTS:
BOTTOM DEPTH (m): 14.5
TIME: 1115

*Dissolved oxygen values are in mg/L

# PAWTUCKAWAY LAKE: BASE MAP FEATURES

- Primary Road
- Secondary Road
- Trail or Other
- Town Boundary
- Transmission Line
- Stream or Shoreline
- Intermittent Stream
- Subwatershed Boundary
- Watershed Boundary
- Surface Water

Data sources:
Watershed boundaries compiled and digitized at 1:24,000 by NH Department of Environmental Services.
Roads, hydrography, boundaries and pipeline features from 1:24,000-scale USGS Digital Line Graph (DLG) data.

This map was produced by the NH DES GIS Program, May 1994.

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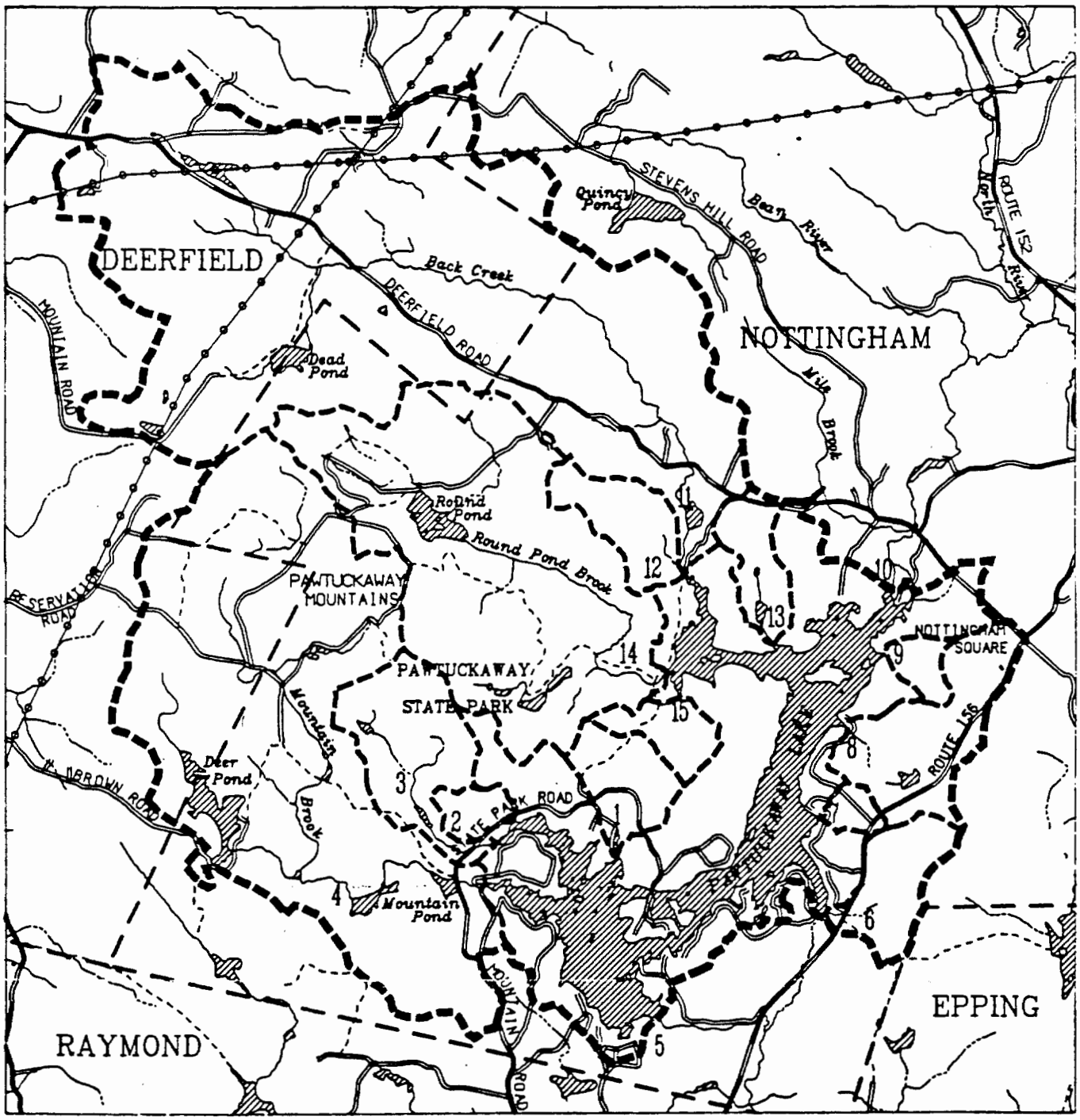


2000 0 2000 4000 6000 8000 FEET

Figure Pawtuckaway Lake Base Map